

Claims

1. (Withdrawn) A method of making a silica filler comprising a crystalline phase, comprising:
drying an amorphous sol comprising silica nanoparticles in the form of chains having lengths of about 5 to about 400 nanometers at a temperature and for a time effective to remove liquid therefrom; and
heating the dried silica sol to a temperature and for a time effective to form at least one crystalline phase therein.
2. (Withdrawn) The method of claim 1, further comprising treating the silica filler comprising a crystal phase with a silane.
3. (Withdrawn) The method of claim 2, wherein the silane comprises gamma-mercaptopropyltrimethoxysilane, gamma-mercaptopropyltriethoxysilane, gamma-aminopropyltriethoxysilane, or a mixture comprising one of the foregoing silanes.
4. (Withdrawn) The method of claim 1, wherein the silica nanoparticles have diameters of about 1 to about 50 nanometers.
5. (Withdrawn) The method of claim 1, wherein the silica nanoparticles have diameters about 1 to about 30 nanometers.
6. (Withdrawn) The method of claim 1, wherein the silica nanoparticles have diameters about 1 to about 20 nanometers.

7. (Withdrawn) The method of claim 1, wherein the silica nanoparticles are in the form of chains having lengths of about 10 to about 300 nanometers.

8. (Withdrawn) The method of claim 1, wherein the silica particles are in the form of chains having lengths of about 10 to about 200 nanometers.

9. (Withdrawn) The method of claim 1, wherein the silica sol further comprises microparticulate filler particles.

10. (Withdrawn) The method of claim 1, wherein the silica sol further comprises an opacifying metal oxide or a calcinable precursor thereof.

11. (Withdrawn) The method of claim 1, wherein the heating is at about or above about 600°C.

12. (Withdrawn) The method of claim 1, wherein the silica filler further comprises at least one amorphous phase.

13. (Withdrawn) A method of making a hybrid silica filler comprising a crystalline phase, comprising:

adding an amorphous sol comprising silica nanoparticles in the form of chains having lengths of about 5 to about 400 nanometers to a microparticulate filler to form a mixture;

drying the mixture at a temperature and for a time effective to remove liquid therefrom; and

heating the dried mixture to a temperature and for a time effective to form at least one crystalline phase therein.

14. (Withdrawn) The method of claim 13, wherein the microparticulate filler is in the form of an aqueous or organic solution.
15. (Withdrawn) The method of claim 13, wherein the solution has a pH of less than about 7.
16. (Withdrawn) The method of claim 13, further comprising treating the hybrid silica filler comprising a crystal phase with a silane.
17. (Withdrawn) The method of claim 16, wherein the silane comprises gamma-mercaptopropyltrimethoxysilane, gamma-mercaptopropyltriethoxysilane, gamma-aminopropyltriethoxysilane, or a mixture comprising one of the foregoing silanes.
18. (Withdrawn) The method of claim 13, wherein the silica nanoparticles have diameters of about 1 to about 50 nanometers.
19. (Withdrawn) The method of claim 13, wherein the silica nanoparticles have diameters about 1 to about 30 nanometers.
20. (Withdrawn) The method of claim 13, wherein the silica nanoparticles have diameters about 1 to about 20 nanometers.
21. (Withdrawn) The method of claim 13, wherein the silica nanoparticles are in the form of chains having lengths of about 10 to about 300 nanometers.
22. (Withdrawn) The method of claim 13, wherein the silica particles are in the form of chains having lengths of about 10 to about 200 nanometers.

23. (Withdrawn) The method of claim 13, wherein the mixture further comprises an opacifying metal oxide or a calcinable precursor thereof.
24. (Withdrawn) The method of claim 13, wherein the heating is at about or above about 600°C.
25. (Withdrawn) A method of making a hybrid silica filler comprising a crystalline phase, comprising:
- adding a microparticulate filler to a neutral or acidic solution comprising an opacifying oxide or calcinable precursor thereof;
 - adding an amorphous sol comprising silica nanoparticles in the form of chains having lengths of about 5 to about 400 nanometers to the solution of opacifying oxide or calcinable precursor thereof and microparticulate filler to form a mixture;
 - drying the mixture at a temperature and for a time effective to remove liquid therefrom; and
 - heating the dried mixture to a temperature and for a time effective to form at least one crystalline phase therein.
26. (Withdrawn) The method of claim 25, wherein the microparticulate filler is in the form of an aqueous or organic solution.
27. (Withdrawn) The method of claim 25, wherein the solution has a pH of less than about 7.
28. (Withdrawn) The method of claim 25, further comprising treating the hybrid silica filler comprising a crystal phase with a silane.

29. (Withdrawn) The method of claim 28, wherein the silane comprises gamma-mercaptopropyltrimethoxysilane, gamma-mercaptopropyltriethoxysilane, gamma-aminopropyltriethoxysilane, or a mixture comprising one of the foregoing silanes.
30. (Withdrawn) The method of claim 25, wherein the silica nanoparticles have diameters of about 1 to about 50 nanometers.
31. (Withdrawn) The method of claim 25, wherein the silica nanoparticles have diameters about 1 to about 30 nanometers.
32. (Withdrawn) The method of claim 25, wherein the silica nanoparticles have diameters about 1 to about 20 nanometers.
33. (Withdrawn) The method of claim 25, wherein the silica nanoparticles are in the form of chains having lengths of about 10 to about 300 nanometers.
34. (Withdrawn) The method of claim 25, wherein the silica particles are in the form of chains having lengths of about 10 to about 200 nanometers.
35. (Withdrawn) The method of claim 25, wherein the mixture further comprises an opacifying metal oxide or a calcinable precursor thereof.
36. (Withdrawn) The method of claim 25, wherein the heating is at about or above about 600°C.
37. (Original) A filler made in accordance with any one of claims 1-36.

38. (Original) A silica filler comprising:

silica particles in the form of chains having lengths of about 5 to about 400 nanometers, and further having at least one crystalline phase.

39. (Original) The silica filler of claim 38, wherein the silica particles are in the form of chains having lengths of about 5 to about 300 nanometers.

40. (Original) The silica filler of claim 38, comprising silica particles having diameters of about 1 to about 50 nanometers.

41. (Original) The silica filler of claim 38, comprising silica particles having diameters of about 1 to about 30 nanometers.

42. (Original) The silica filler of claim 38, comprising silica particles having diameters of about 1 to about 20 nanometers.

43. (Original) The silica filler of claim 38, further comprising a silane surface treatment.

44. (Original) The silica filler of claim 38, wherein the silane comprises gamma-mercaptopropyltrimethoxysilane, gamma-mercaptopropyltriethoxysilane, gamma-aminopropyltriethoxysilane, or mixtures thereof.

45. (Original) The silica filler of claim 44, further comprising a microparticulate glass filler, a ceramic filler, or a mixture thereof.

46. (Original) The silica filler of claim 38, further comprising an opacifying oxide.